

Notice of Allowability

Application No.

10/081,479

Examiner

Daborah Chacko-Davis

Applicant(s)

CHIANG ET AL.

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 06/30/2004.
2. ☒ The allowed claim(s) is/are 1-38.
3. ☒ The drawings filed on 21 February 2002 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: ____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date ____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date ____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date ____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date ____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other ____. |

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Randy Tung on September 15, 2004.

The application has been amended as follows: Claim 1, at line 1, before the term "MIM" the article "an" has been replaced with --a--.

Claim 1, at line 2, after the word "formation" the word -- of-- has been inserted.

Claim 1, at line 3, before the term "MIM" the article "an" has been replaced with --a--.

Claim 1, at line 8, the phrase "following by photoresist and" has been replaced with --followed by a photoresist--.

Claim 1, at line 8, the word "operations" has been replaced with --operation--.

Claim 9, at line 6, after the word "performing" the article "an" has been replaced with --a--.

Claim 10, at line 2, before the word "layer" the term "oxide 2" has been replaced with --oxide-2--.

Claim 15, at line 2, after the word "formation" the word "said" has been replaced with --of an--.

Claim 16, at line 4, the word "increased" has been replaced with --increasing--.

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Claim 17, at line 2, after the word "above" the article "an" has been replaced with --a--.

Claim 18, at line 1, before the term "MIM" the article "an" has been replaced with --a--.

Claim 18, at line 3, before the term "MIM capacitor" the article "an" has been replaced with --a--.

Claim 18, at line 8, the phrase "following by photoresist and" has been replaced with --followed by a photoresist--.

Claim 18, at line 8, the word "operations" has been replaced with --operation--.

Claim 22, at line 4, after the word "thereafter" the word --performed-- has been inserted.

Claim 22, at line 6, after the word "subsequently" the word --performed-- has been inserted.

Claim 26, at line 3, before the words "SiN removal", article "an" has been replaced with --a--.

Claim 27, at line 3, after the word "thereafter" the word --performed-- has been inserted.

Claim 29, at line 3, before the term "stop layer", article - a -- has been inserted.

Claim 32, at line 1, after the term "sequential formation of" the word "said" has been replaced with --an--.

Claim 33, at line 4, the word "increased" has been replaced with --increasing--.

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Claim 34, at line 2, before the term "SiC layer", article "an" has been replaced with --a--.

Claim 34, at line 2, before the term "SiON layer", article "A" has been replaced with --a--.

Claim 35, at line 1, before the term "MIM capacitor", article "an" has been replaced with --a--.

Claim 35, at line 2, before the term "said MIM capacitor" the word - -of-- has been inserted.

Claim 35, at line 3, before the term "MIM capacitor", article "an" has been replaced with --a--.

Claim 35, at lines 29-30, the recitation --thereafter performing a photoresist coating and etch operation upon said substrate and layers thereof to form at least one recess in a DRAM cell node;-- has been deleted.

Claim 36, at line 1, before the term "MIM capacitor", article "an" has been replaced with --a--.

Claim 36, at line 3, before the term "MIM capacitor" article "an" has been replaced with --a--.

Claim 36, at line 2, after the term "sequential formation" the word - -of -- has been inserted.

Claim 36, at line 50, after the word "formation" the word "said" has been replaced with --of an--.

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Claim 37, at line 1, before the term "MIM capacitor", article "an" has been replaced with --a--.

Claim 37, at line 3, before the term "MIM capacitor" article "an" has been replaced with --a--.

Claim 37, at line 15, after the word "thereafter" the word --performed-- has been inserted.

Claim 37, at line 17, after the word "subsequently" the word --performed-- has been inserted.

Claim 38, at line 1, before the term "MIM capacitor" article "an" has been replaced with --a--.

Claim 38, at line 3, before the term "MIM capacitor", article "an" has been replaced with --a--.

Claim 38, at line 15, after the word "thereafter" the word --performed-- has been inserted.

Claim 38, at line 17, after the word "subsequently" the word --performed-- has been inserted.

Claim 38, at line 27, after the word "thereafter" the word --performed-- has been inserted.

Claim 38, at line 32, before the term "stop layer", the article --a-- has been inserted.

The preceding amendments were made to overcome lack of antecedent basis, and minor informalities.

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2. The following is an examiner's statement of reasons for allowance: Claims 1-38, are allowable over the prior art of record (U. S. Patent No. 6,656,785 (Chiang et al) in view of U. S. Patent No. 6,271,084 (Tu et al)) because the prior art of record fails to disclose the formation of an MIM capacitor used in an embedded DRAM device wherein the substrate and the layers of the capacitor further include a metal-1 oxide layer, a metal-2 oxide-1 layer, and a copper layer and said substrate and layers thereof are subjected to a TaN sputter deposition process followed by a photoresist coating and etch operation to form at least one recess in a DRAM cell node.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (571) 272-1380. The examiner can normally be reached on M-F 9:30 - 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

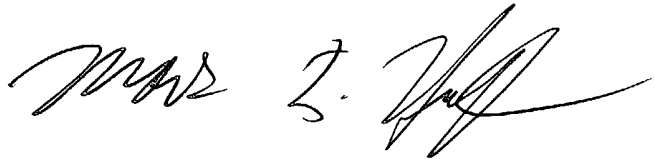
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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dcd



September 15, 2004.



MARK F. HUFF
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